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# MALARIA

## SURVEILLANCE

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# PREFACE

Summarized in this report is information received from State Health Departments and other pertinent sources. It is intended primarily for the use of those with responsibility for disease control activities. Anyone desiring to quote this report should contact the original investigator for confirmation and interpretation.

Contributions to the Surveillance Report are most welcome. Please address to:

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## I. SUMMARY

During the calendar year 1963 there was a significant increase in reported cases of malaria in the United States. A total of 148 confirmed and presumptive cases of malaria with onsets of illness during 1963 were reported to Malaria Surveillance. This represents a 67% increase over the previous 7 year average since active case investigation was established (Table I). This increase is believed to be due partially to improved methods of reporting, but probably represents a real increase in the number of cases of malaria seen in this country.

There was a two-fold increase in the number of civilian cases of malaria in 1963 as compared to the previous year (90 vs. 44). Fewer military cases of malaria were reported this year as compared to last year (58 vs. 75). Thirty-five cases of malaria occurring in merchant seamen were reported in 1963. Twelve of these cases represent a single outbreak of imported malaria which occurred aboard a merchant vessel calling at U.S. ports. A description of this epidemic appears in Section V.

The majority of the cases of malaria were in males in the young adult and mid-adult age range. This distribution was evident in the non-military cases as well as the military cases (Table IV). The order of specie diagnosis in the 128 cases of confirmed malaria was P. vivax (78 cases), P. falciparum (36), P. malariae (9), P. ovale (3), and mixed infections (2). The West African countries, Thailand, Vietnam, Korea and Pakistan were the most common areas of acquisition of malaria for the cases reported in this country.

Five cases of malaria originated in the United States. Two of the cases were induced and three were unclassified. The unclassified cases, though unresolved, offered little evidence in support of autochthonous transmission as a source of the respective infections. A description of these cases appears in Section VI.

The investigation of suspected autochthonous cases of malaria and also transfusion associated malaria was greatly enhanced by the introduction this year of the fluorescent antibody test for malaria as an epidemiologic tool. A description and application of the fluorescent antibody test for malaria is given in Section IV. Utilizing this procedure and conventional epidemiologic techniques, an absence of clearly demonstrated autochthonous malaria in the States during 1963 has been shown.

Four deaths attributed to malaria occurred in the United States during 1963. A description of these cases appears in Section VII.

## II. TERMINOLOGY

A clarification of the accepted terminology of malaria is essential for those wishing to describe and understand the varied facets of this disease. Previous reports have grouped all cases of malaria not having a foreign origin as "indigenous". By current definition this implies that the "indigenous" cases were acquired in a locality where mosquito transmission is a regular occurrence when, in fact, most of these cases were induced, relapsing or unclassified. In referring to the type of acquisition of malaria the following terminology has been recommended by the World Health Organization<sup>(3)</sup> and is this year employed in this report:

### 1. Autochthonous

- a) Indigenous - malaria acquired by mosquito transmission in an area where malaria is a regular occurrence.
- b) Introduced - malaria acquired by mosquito transmission contracted from an imported case in an area where malaria is not a regular occurrence.

### 2. Imported - malaria acquired outside of a specified area.

### 3. Induced - malaria acquired through artificial means, i.e., malariotherapy, blood transfusion, common syringes.

### 4. Relapsing - renewal of clinical activity occurring after an interval from the primary attack greater than that due merely to periodicity.

### 5. Unclassified - malaria in which the method of acquisition is unknown.

## III. SURVEILLANCE DATA

A total of 148 cases of malaria with onsets of illness during 1963 were reported to Malaria Surveillance. Specie identification by a State Health Department, CDC or other laboratory was achieved in 128 cases. These cases represent "confirmed" diagnoses; the remaining 20 cases are classified as "presumptive" diagnoses based on consistent clinical and epidemiological data in the absence of a confirming blood smear. A compilation of the total, confirmed and presumptive cases of malaria reported to Malaria Surveillance for 1963 and the preceding seven years appears in Table I.

Table I

**Cases of Malaria Appraised by Malaria  
Surveillance by Year, United States  
1956 - 1963**

Year	Cases		Total
	Confirmed	Presumptive	
1956	93	32	125
1957	97	6	103
1958	61	11	72
1959	33	21	54
1960	47	16	63
1961	72	13	85
1962	100	19	119
1963	128	20	148

A compilation of the military and civilian cases of malaria for the period 1956-1963 appears in Table II. It may be seen that there was a two-fold increase in the number of civilian cases of malaria in 1963 as compared to the previous year (90 vs. 44). Conversely, there was a decrease in the number of military cases over the preceding year (58 vs. 75).

Table II  
Military and Civilian Cases of Malaria,  
United States 1956 - 1963

<u>Year</u>	<u>Military</u>	<u>Civilian</u>	<u>TOTAL</u>
1956	46	79	125
1957	56	47	103
1958	33	39	72
1959	12	42	54
1960	21	42	63
1961	45	40	85
1962	75	44	119
1963	58	90	148

Although reporting of cases undoubtedly is and has been incomplete and the numbers concerned are small, there would appear to be a definite upward trend in the occurrence of malaria among civilians. This is probably a reflection of the increased frequency and speed of foreign travel. Indicative of this was the large number of merchant seamen reported as malaria cases. A total of 35 cases were seen in this high risk group. Twelve of these individuals were involved in an imported epidemic, whereas the remaining 23 represented isolated cases. Of the four deaths from malaria, which occurred in the United States during 1963, three occurred in merchant seamen.

Further reflecting the role foreign travel played in the increased incidence of malaria was the number of foreign citizens diagnosed with this disease. It may be seen in Table III that there was an increase in the number of cases in this group over the previous year (30 vs. 11).

Table III

Cases of Malaria in Foreign Visitors  
and U.S. Citizens, United States  
1960 - 1963

<u>Year</u>	<u>U.S. Citizens</u>	<u>Foreign Visitors</u>	<u>TOTAL</u>
1960	52	11	63
1961	78	7	85
1962	108	11	119
1963	118	30	148

In the majority of the 1963 cases, the reported attack of malaria represented the individuals' first known clinical episode of the disease as seen in the following table.

	<u>Cases</u>	<u>Percent</u>
No previous malaria	94	71.2
Previous malaria	38	28.8
Unknown	16	--

An age and sex distribution for the 148 total cases and the 90 non-military cases (Table IV) shows a greater percentage of the cases in the young adult and mid-adult years in the military as well as the non-military group. Most of the cases of malaria were in males (128 vs. 20). This age and sex distribution might be explained on the basis of military service in foreign lands and the more frequent employment of male U.S. Citizens in the developing countries where malaria is endemic.

Table IV  
Age and Sex Distribution of Cases of Malaria  
United States 1963

Age Group	All Cases				Non-Military Cases			
	Male	Female	Total	Percent	Male	Female	Total	Percent
0-9	1	1	2	1.5	1	1	2	2.4
10-19	17	2	19	14.4	9	2	11	13.2
20-29	44	7	51	38.6	19	7	26	31.2
30-39	25	4	29	21.9	12	4	16	19.2
40-49	12	3	15	11.4	9	3	12	14.4
50-59	12	2	14	10.6	12	2	14	16.8
60-69	1	-	1	0.8	1	-	1	1.2
70+	-	1	1	0.8	-	1	1	1.2
Unknown	16	-	16	--	7	-	7	--
TOTAL	128	20	148	100.0	70	20	90	100.0

The specie distribution of the 128 confirmed cases of malaria (Table V) shows P. vivax as the most common organism (78 cases) followed by P. falciparum (36), P. malariae (9) and P. ovale (3). There were two mixed infections, one with P. vivax and P. falciparum and the other with P. malariae and P. falciparum.

Table V  
Confirmed Cases of Malaria by Specie,  
United States, 1963

<u>Specie</u>	<u>Total</u>	<u>Percent</u>
<u>P. vivax</u>	78	61.0
<u>P. falciparum</u>	36	28.1
<u>P. malariae</u>	9	7.0
<u>P. Ovale</u>	3	2.3
Mixed Infections	<u>2</u>	<u>1.6</u>
TOTAL	128	100.0

The country of acquisition and specie of Plasmodium acquired by the 148 reported cases appears in Table VI. The West African countries, Thailand, Vietnam, Korea and Pakistan were the most common areas of acquisition of malaria for the cases diagnosed in this country. The global distribution of malaria was also apparent. It may be seen that P. falciparum malaria was more often reported as having been acquired in the African countries and P. vivax malaria from the Asiatic countries, Central and South American and Oceania. P. malariae was the organism most frequently reported in those cases originating in the United States. Of the five cases originating in the United States, two were induced cases and three were unclassified.

Table VI

Distribution by Specie and Area of Acquisition of Reported Cases of Malaria, United States, 1963

	Vivax	Malariae	Falc.	Ovale	Mixed Infection	Unknown	TOTAL
<i>Africa</i>	11	2	27	1	1	8	50
Africa*	3	1	1	-	-	2	7
West Africa*	1	-	17	1	-	1	20
East Africa*	1	-	1	-	-	-	2
North Africa*	-	-	2	-	-	1	3
Angola	-	-	1	-	-	-	1
Cameroon	-	-	1	-	-	-	1
Egypt	1	-	-	-	-	-	1
Ethiopia	-	1	-	-	-	1	2
Ghana	-	-	1	-	-	-	1
Liberia	1	-	1	-	-	1	3
Nigeria	4	-	1	-	1(a)	1	7
Rhodesias	-	-	-	-	-	1	1
Sierra Leone	-	-	1	-	-	-	1
<i>Asia</i>	40	4	3	-	-	7	54
Asia*	1	-	-	-	-	-	1
S.E. Asia*	1	-	-	-	-	1	2
Persian Gulf Area*	1	-	-	-	-	-	1
Cambodia	-	-	-	-	-	1	1
China	-	1	-	-	-	-	1
Hong Kong	-	-	-	-	-	-	1
Indonesia	1	-	-	-	-	-	1
Iran	1	-	-	-	-	-	2
Korea	10	-	-	-	-	-	10
Laos	2	-	-	-	-	-	2
Lebanon	1	-	-	-	-	-	1
Pakistan	9	-	-	-	-	-	9
Thailand	6	3	3	-	-	3	15
Vietnam	6	-	-	-	-	1	7
<i>Central America &amp; Carib.</i>	6	-	4	-	-	-	10
Central America*	-	-	2	-	-	-	2
West Indies*	-	-	1	-	-	-	1
Costa Rica	1	-	-	-	-	-	1
Cuba	1	-	-	-	-	-	1
Honduras	1	-	-	-	-	-	1
Nicaragua	1	-	1	-	-	-	2
Panama	2	-	-	-	-	-	2

Table VI (continued)

	Vivax	Malariae	Falc.	Ovale	Mixed Infection	Unknown	TOTAL
<i>South America</i>	3	-	-	-	-	1	4
<i>South America*</i>	1	-	-	-	-	1	2
Brazil	1	-	-	-	-	-	1
French Guiana	1	-	-	-	-	-	1
<i>Oceania</i>	13	-	1	-	-	-	14
<i>So. Pacific*</i>	2	-	-	-	-	-	2
<i>Polynesian Islands*</i>	1	-	-	-	-	-	1
Australia	1	-	-	-	-	-	1
Borneo	1	-	-	-	-	-	1
New Guinea	3	-	1	-	-	-	4
Okinawa	2	-	-	-	-	-	2
Philippines	3	-	-	-	-	-	3
<i>North America</i>	2	3	-	-	1	-	6
United States (c)	-	-	-	-	-	-	-
Missouri	-	1	-	-	-	-	1
New York	-	1	-	-	1 (b)	-	2
North Carolina	1	-	-	-	-	-	1
Pennsylvania	-	1	-	-	-	-	1
Mexico	1	-	-	-	-	-	1
<i>Unknown</i>	3	-	1	1	-	5	10
<b>Total</b>	<b>78</b>	<b>9</b>	<b>36</b>	<b>2</b>	<b>2</b>	<b>21</b>	<b>148</b>

\* Country unspecified

(a) P. vivax and P. falciparum

(b) P. malariae and P. falciparum

(c) Non-autochthonous cases

#### IV. FLUORESCENT ANTIBODY TEST IN MALARIA SURVEILLANCE

The epidemiologic investigation of cases of induced malaria and suspected cases of autochthonous malaria was greatly facilitated this year by the application of the new indirect fluorescent antibody test for malaria antibody production<sup>(1)</sup>. Evidence suggests that it is possible<sup>(2)</sup> to determine if an individual has had a previous malaria infection by utilizing the indirect fluorescent antibody test with Plasmodium cynomolgi bastianelli as the antigen. It has been shown that this simian antigen exhibits cross reactivity with human malaria parasites<sup>(2)</sup>. The test is especially valuable when parasitemia is absent, provided a suitable period has elapsed from the time of inoculation (2-3 weeks) to allow for the production of malarial antibody. Antibody titers have been shown to persist in detectable amounts in individuals who have left malaria endemic areas to reside in malaria-free areas. Persistence of malarial antibody has been demonstrated for periods ranging from three months to seven years after the last possible exposure<sup>(2)</sup>. There has been no significant degree of false positive reactions to this technique using sera from normal controls and sera from individuals with a variety of diseases<sup>(1)</sup>.

Although developed primarily for use as a research tool, this test allows clarification of transfusion associated malaria and, where appropriate, permits one to clarify the diagnosis of malaria when individuals are reputed to have acquired malaria in a non-endemic area and the slide diagnosis is either absent or in doubt. An example of the test's application is reported below:

##### Case Report - Suspected Autochthonous Malaria

A 48 year-old white male residing in Yuma, Arizona first became ill in late June 1963. He had recurrent chills and fever for approximately one week's duration, and also gave a history of recurrent chills and fever after excessive fatigue during the past two years. A peripheral blood smear was taken during the course of the illness and was said to show P. vivax parasites, however, the slide was not available for confirmation. The patient had not traveled out of Arizona and California for the past 30 years. He stated that he had acquired malaria previously in Oklahoma in 1926. Since the latent period would be too great for this to be a relapse of P. vivax malaria dating back to 1926 and since several other suspected cases of autochthonous malaria had been reported from the Yuma area in recent years, it was deemed essential to determine whether this case actually represented malaria. Serum was obtained from the patient five months after his illness and tested with the fluorescent antibody test for malaria. The test was negative. Had the patient truly had a parasitemia at the time of his most recent illness, the fluorescent antibody test would have been positive. Sera from other cases of suspected autochthonous malaria, without sufficient documentation to classify them as "confirmed", were similarly tested with the fluorescent antibody technique and were also found to be negative. In the absence of this test the endemicity of malaria in Arizona would have remained in doubt. Use of the test essentially ruled out the suspected cases of

malaria and helped establish the fact that Arizona was free of reported autochthonous malaria.

(Reported by Dr. Philip M. Hotchkiss, Arizona State Epidemiologist;  
Investigated by Dr. Stanley Foster, EIS Officer, Phoenix, Arizona)

## V. EPIDEMIC REPORT

### Imported Malaria

The majority of cases of malaria reported each year are imported cases. It is rare, however, to have an epidemic of malaria imported to this country but such an event occurred during 1963. In late October a Norwegian merchant vessel carrying coffee and cocoa beans from ports in West Africa called at Philadelphia. Aboard the ship were 36 officers and men, one child, two women passengers and the body of a crew-member, who had died two days prior to reaching Philadelphia. While still at sea three of the crew-members took ill. Two of the men (cases no. 1 & 2, Table VII) had chills, headache, muscle pain and fever lasting for 6 days in each case and remitting spontaneously. The dead man (case no. 3) had chills, headache and generalized muscle pain but no fever. He succumbed after a 5 day illness. He was later autopsied at the Philadelphia City Morgue. The autopsy revealed a cerebral infarction and although malaria was not suspected at this time, later sectioning of the brain revealed an overwhelming parasitism of the red blood cells within the small vessels of the brain substance. While in Philadelphia two more crew-members (cases no. 4 & 5) fell ill with chills, fever, headache and muscle pain. One of the men was removed from the ship and hospitalized in Philadelphia. The second seaman traveled with the ship to Newark during which time his condition deteriorated and after having lapsed into coma he was taken to a hospital in Newark. On the day the ship arrived in Newark one other crew-member (case no. 6) developed chills, headache, muscle pains and fever and after three days also lapsed into coma and was hospitalized at the same hospital in Newark. Smears done on these two men revealed P. falciparum, and initiated an investigation of this explosive epidemic.

During the investigation two other clinical cases (cases no. 7 & 8) were found and 4 individuals with asymptomatic parasitemia, were uncovered (Figure 1). Twelve of the 40 individuals aboard the ship were affected (attack rate = 30%). At the time of this writing, sera from most of the crew-members and passengers are being tested by the fluorescent antibody technique for malaria; results are not yet available. The ship had called at the Cape Verde Islands, Lobito, Matadi, Abidjan, Tema, Takoradi and Conakry (Figure II). The investigation revealed that the infections were acquired in at least two of these West African ports. The west coast of Africa is known to be hyperendemic for P. falciparum malaria and proved to be a deadly environment for this non-immune, inadequately protected group.

Several other instances, each representing isolated cases, of foreign seamen visiting ports in West Africa and then entering this country at approximately the same time that they became symptomatic from P. falciparum malaria, have been reported to us during the year.

(Reported by Dr. W.F. Dougherty, Director, Division of Preventive Disease, New Jersey State Department of Health; Dr. W.D. Schrack, Jr., Director, Division of Communicable Disease Control, Pennsylvania State Department of Health; Dr. Sylvan Fish, Philadelphia Department of Public Health; Dr. Myron G. Schultz, EIS Officer, Atlanta, Ga.; Dr. Steven Cohen, EIS Officer, Trenton, New Jersey)

Table VII

Cases of Malaria Aboard Merchant Vessel

Symptomatic Cases

<u>Patient</u>	<u>Rating</u>	<u>Age</u>	<u>Onset</u>	<u>Para-sitemia</u>	<u>Symptoms</u>
1) F.S.	Chief Engineer	29	10/9	No	Recovered spontaneously
2) G.H.	Chief Steward	35	10/11	No	Recovered spontaneously.
3) P.M.	Oiler	54	10/12	Yes	Died two days prior to reaching Philadelphia.
4) H.O.	AB	32	10/19	Yes	Originally thought to be influenza. Dx malaria. Responded to oral chloroquine.
5) S.D.	AB	18	10/19	Yes	Dx cerebral malaria. Responded to parenteral chloroquine.
6) R.C.	Engine Boy	18	10/21	Yes	Dx cerebral malaria. Responded to parenteral chloroquine.
7) P.S.	Wife of Chief Eng.	31	10/23	Yes	Recovered concomittant with chloroquine therapy.
8) K.S.	AB	20	10/23	No smear	Recovered concomittant with chloroquine therapy.

Asymptomatic Cases

9) E.S.	AB	16	--	Yes	Discovered on survey of crew.
10) K.L.	AB	17	--	Yes	Discovered on survey of crew.
11) K.D.	AB	19	--	Yes	Discovered on survey of crew.
12) K.R.	AB	25	--	Yes	Discovered on survey of crew.

Figure 1  
 EPIDEMIC CURVE OF MALARIA OUTBREAK  
 BY DATE OF ONSET

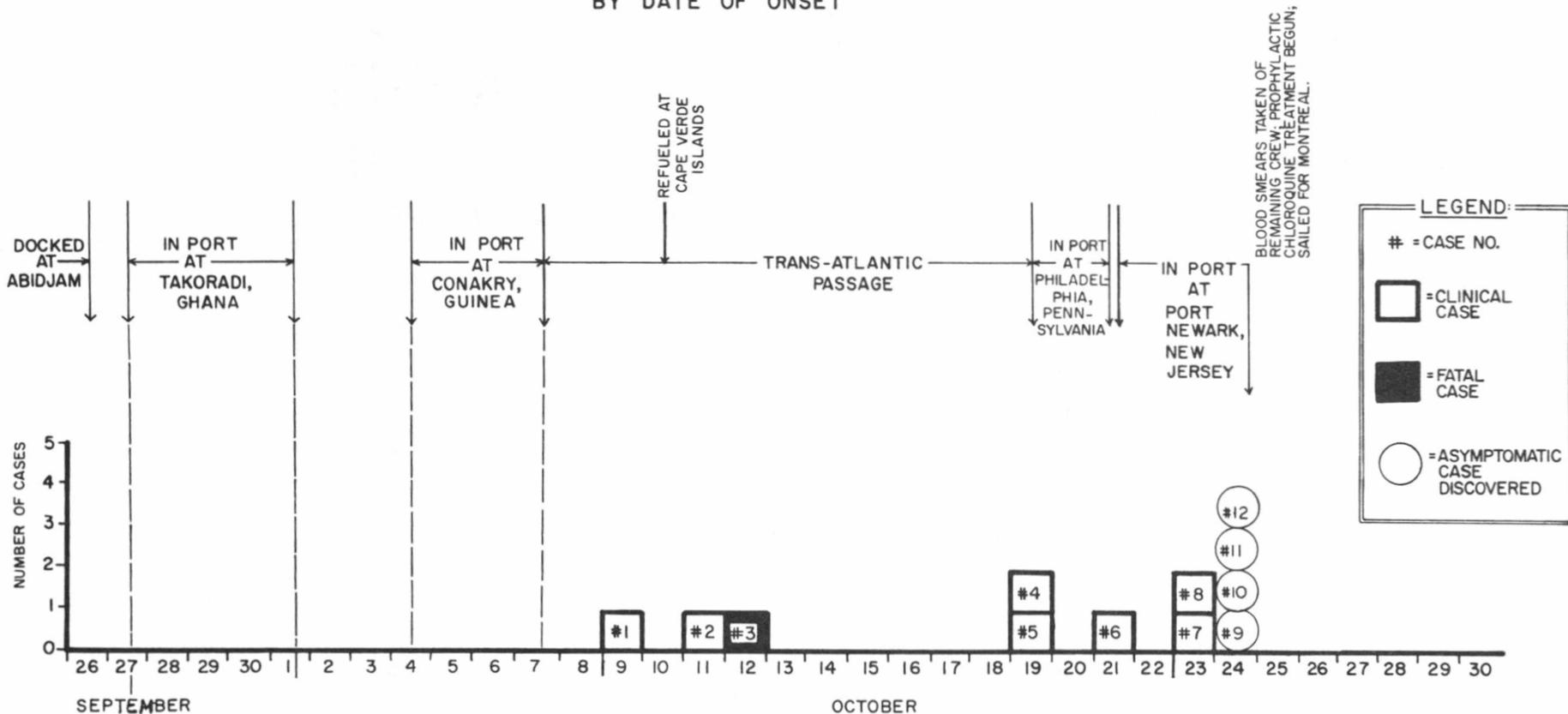


Figure II. ROUTE OF MERCHANT VESSEL

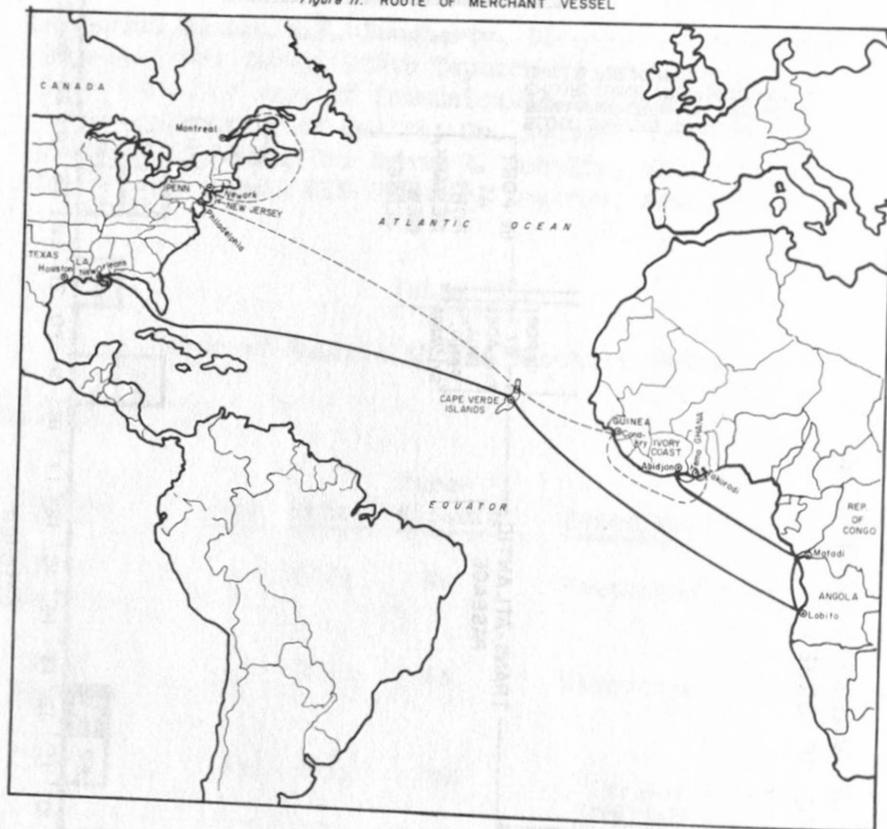


Table II  
Log of Merchant Ship

Ports of Call	Arrived	Left	Days Stayed	Activities
Houston, Texas	7/26	7/28	2	Loaded general cargo
Lake Charles, La.	7/28	7/30	2	Loaded general cargo
New Orleans, La.	8/1	8/6	5	Loaded general cargo
Cape Verde Islands	8/20	8/20	½	Loaded general cargo
Lobito, Angola	8/30	9/11	12	Refueled at sea. Men did not leave ship
Matadi, Republic of Congo	9/13	9/20	7	Unloaded general cargo - men at liberty but did not go inland
Abidjan - Ivory Coast	9/24	9/26	2	Unloaded general cargo - men at liberty but did not go inland
Tema - Ghana	9/27	9/27	½	Loaded coffee - men at liberty but did not go inland
Takoradi - Ghana	9/27	10/1	4	Unloaded general cargo - men did not leave ship
Conakry - Guinea	10/4	10/7	3	Loaded cocoa beans - men at liberty but did not go inland
Cape Verde Islands	10/10	10/10	½	Loaded cocoa beans - men at liberty but did not go inland
Philadelphia, Pa.	10/19	10/21	2	Refueled at sea. Men did not leave ship
Port Newark, N.J.	10/21	10/25	4	Unloaded cargo

Sailed on 10/25 for Montreal, Canada

VI. MALARIA ACQUIRED IN THE UNITED STATES

Induced Cases

Case No. 1

In March 1963 a 39 year-old white male was admitted to a New York City hospital for an open valvuloplasty to correct an aortic stenosis and aortic insufficiency. During and immediately after the operation he received 23 units of blood, some of which had been used to prime the pump. On the 12th post-operative day he developed a spiking fever and during the next 6 days, while continuing to spike fevers, he developed splenomegaly, sub-ungual hemorrhages, and hemorrhages of the mucous membranes. Serial blood cultures were persistently negative. A peripheral blood smear done on the 6th day of fever revealed the presence of P. falciparum and P. malariae in the red blood cells.

An investigation was conducted by the New York City Health Department. All 23 blood donors were located, however, peripheral blood smears performed on each donor were negative. At a later time sera was obtained from 15 of the blood donors and tested by the fluorescent antibody technique for malaria. Each sera proved negative, including the serum of an individual who had recently returned from Ghana. The patient made a prompt recovery after the initiation of chloroquine therapy. Further attempts are being made to obtain the sera of the remaining 8 donors to complete the epidemiologic picture in this interesting case of induced malaria.

(Reported by Dr. Fuerst, Director, Bureau of Preventable Diseases, Department of Health, New York City, N.Y.; Dr. Benjamin Kean, Professor of Tropical Medicine, Medical College, Cornell University and Dr. Myron G. Schultz, EIS Officer, Atlanta, Georgia).

Case No. 2

In October 1963 a 24 year-old white male laborer visited his physician complaining of cough, sore throat, weakness and fever. His symptoms and physical examination were consistent with the diagnosis of "flu" but when told this by his physician the patient stated that he probably had malaria. When asked why he thought he had malaria, the patient volunteered that he contracted malaria in Georgia during March 1962 while working on a "government project". Since the physician correctly reasoned that there had been snow on the ground in Georgia at that time and that no cases of autochthonous malaria had been reported from Georgia for many years he discounted the patient's self diagnosis. When the patient's illness persisted for several days without responding to conventional therapy he volunteered to his physician that when stating "government project" he meant he had been institutionalized at the Atlanta Federal Penitentiary and while there had volunteered for a study in malaria chemotherapy. Plasmodium vivax was detected on blood smear and he quickly responded to antimalarial therapy. This delayed primary attack of P. vivax malaria occurred approximately 12

months after the patient's release from the Penitentiary. Since studies of this nature are usually conducted on inmates committed for a long period of time and therefore, under constant surveillance, this delayed primary attack occurring in civilian life represented an unusual case as well as a diagnostic and semantic challenge to the practitioner.

(Reported by Dr. Jacob Koomen, Assistant Director, Division of Epidemiology, North Carolina State Board of Health; Dr. Ronald Levine, EIS Officer, Raleigh, North Carolina and Dr. Joseph Lunn, NIAID, Atlanta Federal Penitentiary).

Unclassified Cases

Case No. 3

In July 1963 a 56 year-old female resident of Pittsburgh, Pennsylvania first experienced chills which occurred every 4th day. A urinary tract infection was discovered at that time and her symptoms were initially ascribed to this disorder. Despite antibiotic therapy the symptoms persisted and in late October she entered a Pittsburgh hospital. On physical examination she was found to have a spleen enlarged two finger breadths below the costal margin. During her hospital stay a peripheral blood smear revealed the presence of P. malariae in the red blood cells. After the initiation of chloroquine and primaquine therapy she became asymptomatic.

The patient was born in Czechoslovakia and immigrated to the United States at the age of 1 1/2. Since then she has never left the United States. She has never been known to have had malaria at any earlier time in her life. She has traveled throughout the northeast United States on rare occasions, but no more recently than 10 years ago. During the past decade she denied ever having been outside Allegheny County. Furthermore, she denied a history of drug addiction and she had never received any blood transfusions. A check of 33 regional hospitals and blood banks confirmed the negative blood transfusion history. Similarly a check with local, state and federal law enforcement agencies revealed no suspicion of narcotics usage.

During the past 3 years, there have been 4 cases of malaria in residents of Allegheny County. None of these cases were due to P. malariae so that introduced malaria appears unlikely in this case. Despite intensive investigation, no information suggesting a possible means of acquisition could be uncovered.

(Reported by Edwin Brown, M.D., Chief, Division of Disease Control and Herbert R. Domke, M.D., Health Officer, Allegheny County Health Department; Dr. W.D. Schrack, Jr., Director, Division of Communicable Disease Control, Pennsylvania State Department of Health and Dr. Michael Lane, EIS Officer, Pittsburgh, Pennsylvania).

Case No. 4

In January 1963 a 78 year-old white female was admitted to a hospital in St. Louis, Missouri with a 3 month history of rapidly enlarging left upper quadrant mass and feelings of "abdominal dragging", fatigue and weakness. The only positive physical findings were hepatosplenomegaly. Blood studies revealed a pancytopenia and mild anemia. Other studies were within normal limits. The patient was operated upon and the spleen, enlarged 5 to 6 times normal size, was removed. One unit of blood was given to the patient. Subsequent to the operation, she had a hematologic remission, and felt completely well. Sections of the spleen failed to reveal any pathogenic organisms, however, cultures of the removed spleen showed Histoplasma capsulatum. Skin tests and complement-fixation tests for histoplasmosis were negative on several occasions. She made an uneventful recovery and was discharged from the hospital.

In late March the patient reentered the hospital with the chief complaint of intermittent chills and fever. During her hospital stay she continued to have intermittent chills and fever. A peripheral blood smear was taken and revealed the presence of P. malariae parasites. The patient was treated with chloroquine and primaquine and made a prompt recovery.

The patient had no previous history of malaria. She had resided in a small town in Missouri all of her life. She had no known contact with malaria patients but did have a blood transfusion at the time of her surgery. Because of the possibility of this being a case of induced malaria, the blood donor was located and interviewed. He stated that he had never been aware of any illness resembling malaria. During World War II he had been stationed in New Guinea where some of his friends did develop malaria. He had given many blood transfusions in the recent past to friends and family members and none of them had been known to come down with the disease. A serum specimen was obtained from the donor and tested with the fluorescent antibody test for malaria. It was negative.

The blood donor was effectively ruled out as the source of the malaria parasites. Although it might appear that the patient was suffering from malaria at the time of her original illness and surgery, a thorough review of the clinical and pathological workup at that time failed to reveal the presence of the parasites. In the absence of a definite history of previous malaria and the failure to demonstrate a recent acquisition this case remains enigmatic and unclassified.

(Reported by Dr. E. A. Belden, Communicable Disease Consultant, Missouri Department of Health; Dr. Jane Cadbury, St. Louis County Health Department and Dr. Jonathan Levine, EIS Officer, St. Louis, Missouri.)

Case No. 5

In January of 1963 a 59 year-old white male first began to experience shoulder pains, chills and fever. His symptoms persisted for 3 weeks prior to his admission to a New York hospital and for one week after his admission. During the patient's hospital workup, *P. malariae* was found in the red blood cells. The patient was given antimalarial therapy and made a prompt recovery.

The patient immigrated to this country from Ireland in 1927. Since that time he had not been out of the northeastern part of the country. In 1933 he received a blood transfusion but has not had any transfusion since that time 30 years ago. Three months prior to his present illness he suffered an acute myocardial infarction and was hospitalized for one month. During his hospitalization he received no blood products and all injections were given by disposable needles and syringes. There was no history of narcotic addiction. The diagnosis based on the analysis of the peripheral blood smear was confirmed by several competent laboratories, yet an epidemiologic investigation failed to reveal the source of this patient's infection.

(Reported by Dr. Robert M. Albrecht, Director, Epidemiology Division, New York State Department of Health.)

The unclassified cases offered little evidence in support of autochthonous transmission as a source of the respective infections. Since the cases of suspected autochthonous malaria in Arizona were found not to be malaria and no other reports of suspected autochthonous malaria were received from the rest of the country, it is felt that the United States was free of autochthonous malaria in 1963.

VII. MALARIA DEATHS

Four deaths attributed to malaria were reported to Malaria Surveillance during 1963. Three of these deaths occurred in foreign seamen, each of whom had visited African ports just prior to the onset of their illnesses. In each of these three cases the causative organism was *P. falciparum*.

One of the fatal cases (case no. 3, Section V) has been described earlier.

A second fatal case occurred in April 1963, and involved a 28 year-old Norwegian seamen who was brought to the emergency room of a hospital in Norfolk, Virginia. He was dead on arrival. A friend volunteered that the man had been sick for six days prior to his death beginning shortly after his ship departed West Africa for the United States. He had complained of abdominal pain and malaise. No other pertinent history was available. No other men aboard the ship were known to be ill.

Autopsy revealed the presence of marked icterus, hepatomegaly and visceral congestion. Microscopic examination showed heavy parasitemia. The organism was later identified as P. falciparum.

(Reported by Dr. James B. Kenley, Director, Bureau of Epidemiology, Virginia State Department of Health.)

The third fatal case occurred during November 1963. A 52 year-old German sea captain was admitted to a hospital in Louisiana with a febrile illness of approximately 10 days duration. The patient had recently returned from a trip to North Africa. One other crew-member was said to have contracted malaria during the voyage.

During his hospital workup, P. falciparum was found in his red blood cells. He also had anemia, bronchopneumonia and diabetes. Despite intensive therapy the patient succumbed during the second week of his hospitalization.

(Reported by Dr. John A. Trautman, Division of Hospitals, U.S. P.H.S.)

The fourth case involved a 36 year-old white male who was admitted to a hospital in Minnesota in December 1963 for chills and fever. The patient believed this was an exacerbation of malaria acquired recently in the Rhodesias. He is said to have had several other exacerbations of malaria in the recent past. Six hours after admission the patient suddenly died. An autopsy was not granted and peripheral blood smears were not available for examination. (This case cannot be considered as a death due to confirmed malaria as the evidence for a malaria causation is only presumptive.)

(Reported by Dr. C.B. Nelson, Chief, Section of Acute Communicable Diseases, Minnesota Department of Health.)

#### VIII. ACKNOWLEDGEMENT

The Malaria Surveillance Report is prepared annually at the Communicable Disease Center based on information received on individual case forms submitted by State Health Departments.

We wish to take this opportunity to express our appreciation to the States for their continued interest and support of this program. All cases of malaria, regardless of where they are acquired, should be reported to this office. Extra copies of the National Malaria Surveillance Report form, PHS 4.80 (CDC) are available upon request. In addition, whenever possible,

every effort should be made to obtain thick and thin blood smears in each case. These smears may either be submitted with the surveillance form to this office, or mailed directly to the National Malaria Repository, Parasitology Unit, CDC. Blood smears not only enable diagnostic confirmation but also serve, in the event of relapse or reinfections, as reference to previous disease. In doubtful or unusual cases 5 cc's of the patient's serum, obtained 2-3 weeks after the suspected time of infection, should also be submitted for performance of the fluorescent antibody test for malaria.

The third case occurred during November 1963. A 32 year-old German sea captain was admitted to a hospital in Louisiana with a febrile illness of approximately 10 days duration. The patient had recently returned from a trip to North Africa. The other crew-member was said to have contracted malaria during the voyage.

We are indebted to Dr. Sanford F. Kuvin, Assistant Professor of Medicine, Division of Infectious Diseases and Dr. Elizabeth Barrett, Resident in Medicine, University of Miami School of Medicine, for performing the malaria fluorescent antibody tests.

(Reported by Dr. John A. Treatmentman, Division of Hospitals, U.S. P.H.S.)

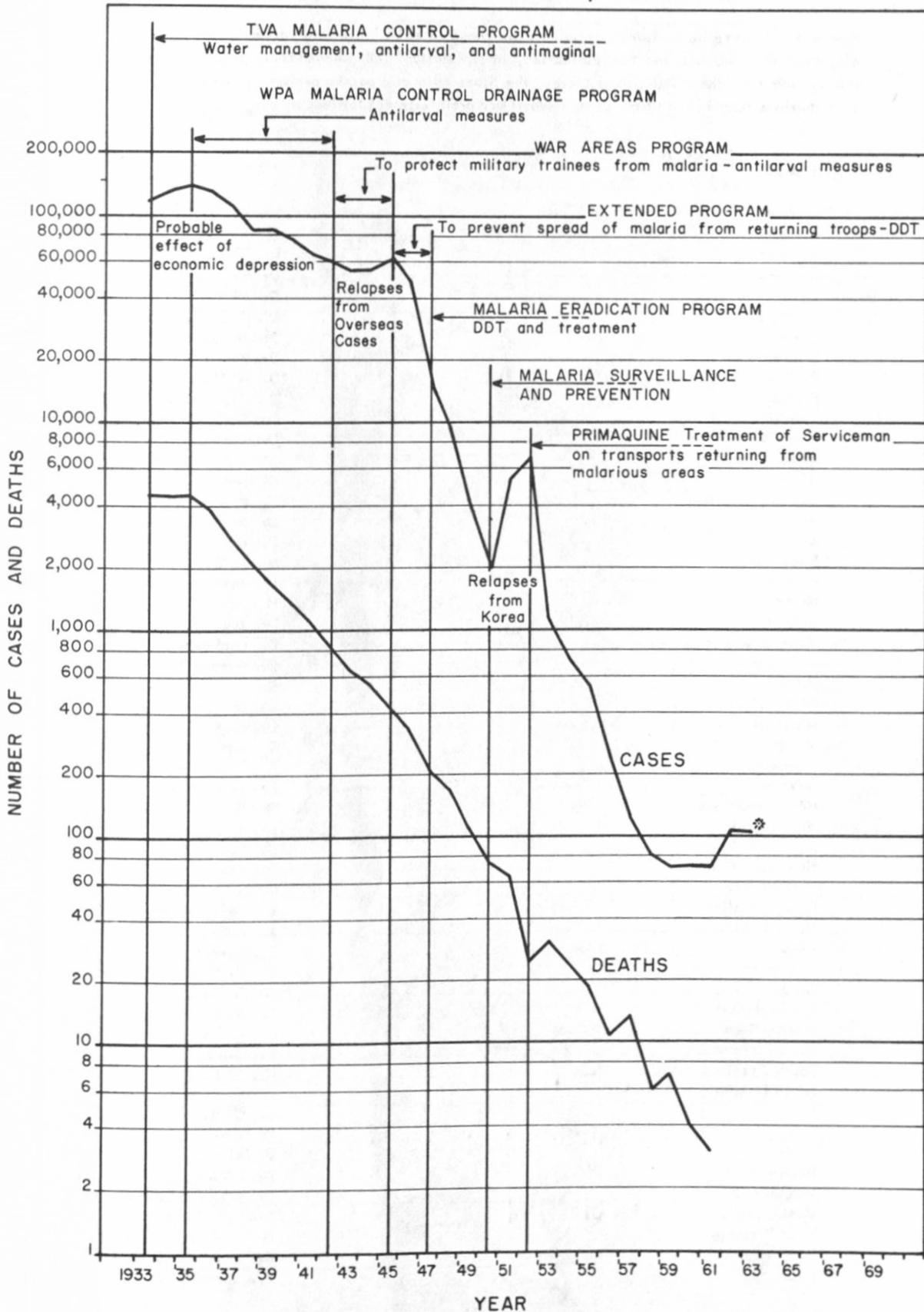
The fourth case involved a 38 year-old white male who was admitted to a hospital in Minnesota in December 1963 for chills and fever. The patient believed that was an exacerbation of malaria acquired recently in the Philippines. He is said to have had several other exacerbations of malaria in the past year. Six hours after admission the patient suddenly died. An autopsy was not granted and peripheral blood smears were not available for examination. (This case cannot be considered as a death due to malaria as the evidence for this conclusion is only presumptive.)

REFERENCE

Reported by Dr. C.B. Weisner, Chief, Section of Acute Communicable Diseases

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# REPORTED MALARIA MORBIDITY AND MORTALITY IN THE UNITED STATES, 1933-1963



SOURCE: NVSD and CDC

\* Preliminary

Key to all disease surveillance activities are those in each State who serve the function as State epidemiologists. Responsible for the collection, interpretation and transmission of data and epidemiological information from their individual States, the State epidemiologists perform a most vital role. Their major contributions to the evolution of this report are gratefully acknowledged.

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